REMARKS

Claims 1, 3-15, 17, 19-31, and 33-44 were presented for examination. In an Office action dated February 15, 2008, all pending claims were rejected. Claims 1, 15, 17, and 31 are amended herein to more distinctly claim Applicant's invention. Claims 4, 20, and 34 are cancelled herein.

Applicant thanks the Examiner for examination of the claims pending in this application and addresses the Examiner's comments below. Based on the above Amendment and following Remarks, Applicant respectfully requests that the Examiner reconsider all outstanding rejections and withdraw them.

Response to Rejections Under 35 USC 103(a)

The Examiner rejected claims 1, 3-6, 8-9, 11-13, 15, 17, 19-22, 24-25, 27-29, 31, 33-36, 38-39, and 41-43 under 35 USC § 103(a) as allegedly being unpatentable over U.S. Patent No. 6,539,351 to Chen et al. ("**Chen**") in view of Pellom et al., 'An efficient scoring algorithm for Gaussian mixture model based speaker identification', IEEE signal processing letters, Vol. 5, 1998, pages 28, 1-284 ("**Pellom**"), in further view of U.S. Patent No. 5,271,088 to Bahler ("**Bahler**"). The Examiner also rejected claims 7, 10, 23, 26, 37 and 40 under 35 USC § 103(a) as allegedly being unpatentable over Chen, Pellom, and Bahler, in further view of Arya et al., "An optional algorithm for approximated nearest neighbor searching in fixed dimensions", Journal of the ACM, Vol. 45, No. 6, November 1998, pp. 89, 1-923, ("**Arya**"). The Examiner also rejected claims 14, 30, and 44 as being unpatentable over Chen, Pellom, and Bahler, in further view of U.S. Patent No. 5,414,755 to Bahler et al. ("**Bahler '755**"). Claims 4, 20, and 34 have been cancelled. These rejections with respect to the remainder of the pending claims are traversed.

As amended, claim 1 recites a method of voice recognition comprising "estimating a probability density function of a subset of the plurality of speaker data points using Parzen windows, wherein the subset comprises the approximate nearest neighbors to an unidentified voice sample from an unidentified speaker, the subset not including all speaker data points in the plurality of speaker data points, wherein the relative contributions to the density of individual speaker data points within the subset of speaker data points is based on a distance to a speaker data point from the unidentified voice sample, wherein the relative contributions of speaker data points at closer distances are greater than the relative contributions of speaker data points at further distances." Independent claims 15, 17, and 31 similarly recite these features of claim 1. These features of the claimed invention are beneficial because the Parzen windows approach requires no training, but it is computationally intensive in terms of time and computing power. To improve the performance of the method and save computational resources, the probability density function is estimated for a subset of the plurality of speaker data points, the subset not including all speaker data points. This allows the method to be applied even for large datasets. See Applicant's Specification paragraphs 4-8 for a discussion of the inadequacies with regard to accuracy and computational efficiency of prior methods, particularly for large and feature rich data sets. Further, the claimed invention allows for the control of the relative contributions to the density of the individual speaker data points based on a distance to a speaker data point from the unidentified voice sample. See, e.g., Applicant's Specification paragraphs 34 and 43.

Chen discloses generating high dimensional acoustic models via mixtures of compound Gaussians with linear transforms for speech and speaker recognition. See, Abstract. As the Examiner acknowledges, Chen does not disclose use of the approximate

nearest neighbors to an unidentified voice sample. Chen also does not disclose or suggest "the relative contributions to the density of individual speaker data points within the subset of speaker data points is based on a distance to a speaker data point from the unidentified voice sample …", nor does the Examiner suggest that Chen does so disclose or suggest.

Pellom does not remedy the deficiencies of Chen. Namely, Pellom does not disclose or suggest "the relative contributions to the density of individual speaker data points within the subset of speaker data points is based on a distance to a speaker data point from the unidentified voice sample, wherein the relative contributions of speaker data points at closer distances are greater than the relative contributions of speaker data points at further distances." In rejecting claim 4 in the Office Action dated February 15, 2008, the Examiner suggests that Pellom discloses controlling relative contributions by sampling observations nearest to the midpoint of previously scored elements. P. 282, right col., paragraph 2. Pellom discloses a sampling scheme that uses an initial subset of observations that are uniformly spaced to generate the next subset of observations by selecting the observations nearest the midpoints between the initial uniformly spaced observations. Thus, in Pellom, the contributions of elements are based on distances from each other. In contrast, in the claimed invention, the relative contributions are based on a distance to a speaker data point from the unidentified voice sample, as recited in the independent claims. Moreover, there is no hint or suggestion in Pellom that the relative contributions of speaker data points at closer distances are greater than the relative contributions of speaker data points at further distances, as is also recited in the independent claims. Thus, neither Chen nor Pellom discloses or suggests at least these features of the claimed invention.

Bahler does not remedy the deficiencies of Chen and Pellom. Namely, Bahler does not disclose or suggest "the relative contributions to the density of individual speaker data points within the subset of speaker data points is based on a distance to a speaker data point from the unidentified voice sample, wherein the relative contributions of speaker data points at closer distances are greater than the relative contributions of speaker data points at further distances." Bahler discloses message match scoring using Parzen estimates of local probability density. In the Parzen estimate, the distance from the observation point of the unknown to its nearest neighbor in a reference class is used. Col. 8, ln. 31-42. However, there is no teaching or suggestion that the relative contributions to the density of individual speaker data points within the subset of speaker data points is based on a distance to a speaker data point from the unidentified voice sample. Moreover, there is no hint or suggestion in Bahler that the relative contributions of speaker data points at closer distances are greater than the relative contributions of speaker data points at further distances, as is also recited in the independent claims. Hence, it would be improper to reject the independent claims based on the combination of Chen, Pellom, and Bahler for at least these reasons.

Arya also does not remedy the deficiencies of the Examiner's proposed combination of Chen and Pellom, even with the addition of Bahler, as discussed above. Arya discloses a kd-tree data structure. Page 914, paragraph 2. Arya does not disclose or suggest the features of "the relative contributions to the density of individual speaker data points within the subset of speaker data points is based on a distance to a speaker data point from the unidentified voice sample, wherein the relative contributions of speaker data points at closer distances are greater than the relative contributions of speaker data points at further distances," as recited

in claim 1 nor the other similar features recited in claims 15, 17, and 31, nor does the Examiner suggest that Arya does disclose these features.

Bahler '755 also does not remedy the deficiencies of the Examiner's proposed combination of Chen and Pellom, even with the addition of Bahler, as discussed above. Bahler '755 discloses a "text-independent approach" to speaker recognition. Col. 4, ln. 28-36. Bahler '755 does not disclose or suggest the features of "the relative contributions to the density of individual speaker data points within the subset of speaker data points is based on a distance to a speaker data point from the unidentified voice sample, wherein the relative contributions of speaker data points at closer distances are greater than the relative contributions of speaker data points at further distances," as recited in claim 1 nor the other similar features recited in claims 15, 17, and 31, nor does the Examiner suggest that Bahler '755 does disclose these features.

For the reasons discussed above, Applicant respectfully submits that it is improper to reject the independent claims 1, 15, 17, and 31 under 35 USC § 103(a) based on the combination of Chen, Pellom, Bahler, Arya, and/or Bahler '755. As the remaining pending claims depend either directly or indirectly from the patentable independent claims 1, 15, 17, and 31 discussed above, all arguments advanced above are hereby incorporated so as to apply to these dependent claims with equal force. In addition, the dependent claims recite other patentable features which further distinguish them from the prior art of record. Applicant submits that the pending dependent claims are patentable over the prior art of record by reason of their dependence, in addition to the further patentable limitations recited therein.

Conclusion

In sum, Applicant respectfully submits that all claims now pending are patentable over the cited references for at least the reasons given above, while not necessarily conceding any contention not specifically addressed. Applicant requests reconsideration of the basis for the rejections of these claims and requests allowance of them.

If the Examiner believes that for any reason direct contact with Applicant's attorney would help advance the prosecution of this case, the Examiner is invited to telephone the undersigned at the number given below.

Respectfully Submitted,
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